Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

Requirements for Satellite Photography for about the Next Five Years

1. Recent USIB actions on this subject are as follows:

a. Short-Term R&D

USIB-D-41.13/2 (COMOR-D-13/17) of 31 July 1964 approved COMOR recommendations that development work proceed urgently toward achievement of a single capability for search and surveillance with a continuous stereoscopic ground coverage equivalent to KH-4 and a resolution equivalent to KH-7; and a capability which will permit interpretation of details on the order of one foot or less on a side even with a swath width half that of KH-7. In addition COMOR made certain recommendations regarding priority which USIB did not approve.

b. Vulnerability

USIB-D-41.14/167 (COMOR-D-13/20) of 14 August 1964 reminded the NRO of the urgent need for the protection of U.S. satellite reconnaissance vehicles against Soviet anti-satellite capabilities.

c. Crisis Satellites

USIB-D-41.15/42 (COMOR-D-48/91) of 14 September 1964 requested the NRO to maintain a crisis standby capability with the KH-7 as had been done with the KH-4 and remanded to COMOR its paper on this subject with instructions to broaden its considerations of crisis collection vehicles to include manned systems and possible quick-reaction satellites.

Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

2. This paper contains no recommendations on the number of photographic satellites required for crisis situations in view of other work underway in response to the USIB directive mentioned in 1.c. above. Our remaining requirements for about the next five years are stated in the paragraphs below.

General Search and Surveillance

3. We believe that high quality overhead photography with a swath width of at least 200 miles and a ground resolution of three to five feet is needed to meet requirements for general search and surveillance of the USSR, China, the European satellites, and other selected areas of the world. Such photography would provide substantially more information bearing on important intelligence problems than can now be obtained by the KH-4 system. For example, a 3-foot resolution would greatly improve our capability to: (a) monitor future offensive missile development and deployment (e.g., small ICBMs), (b) locate mobile defensive missile systems, (c) locate and identify ABM installations and determine the interrelationships among their facilities, (d) locate and identify submarines by class, (e) identify small nuclear energy production facilities and detect changes in known facilities, and (f) capitalize on targets of opportunity. Furthermore the quality of base-line coverage useful in retracing the development of newly-identified facilities and in producing order-of-battle and indications intelligence would be increased to a marked degree. A swath width of at least 200 miles is required in light of the

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extensive land masses to be covered, the large size of many target complexes, and the need for simultaneous coverage of targets falling into a single intelligence category (e.g., heavy bombers at several airfields).

4. We recognize, however, that the fulfillment of our intelligence requirements for broad area search and follow-up surveillance over the next two or three years will be limited by the resolution of the KH-4 system. To provide guidance for operating the KH-4 in that time span, we summarize below our requirements for useable photography derived from the KH-4 system:

a. Quarterly coverage of about 50 percent of the targets in the USSR and China in each of the highest priority categories (e.g., 50 percent of the ICBM complexes). Currently there is a total of roughly 100 such targets. Regular quarterly coverage of a few of these high priority targets is required (e.g., Lop Nor and Tyura Tam).

b. Semi-annual coverage of a substantial portion (say 75 percent) of the built-up areas of the USSR and China.

c. Annual coverage of substantially all (say 90 percent) of the USSR, China and the European satellites.

d. Limited coverage of other areas of the world, as required from time to time, primarily as a by-product of the missions conducted in response to the foregoing needs.

Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

5. On the basis of past experience and taking account of weather, we believe that the foregoing requirements can be met by ten successful CORONA J missions each year, i.e., 20 film packages. We also believe that these missions should be spaced fairly evenly throughout the year and that the zombie mode should be perfected and used. There should also be a reserve of equipment sufficient to provide for about three additional successful CORONA J missions to meet particularly pressing intelligence needs of an ad hoc nature, should such needs arise.

6. At the earliest practicable time, the general search and surveillance function should be taken over by the improved system discussed in paragraph 3 above. We cannot at this time predict the number of successful missions required to provide general search and surveillance coverage with a 3-5 foot resolution, 200 mile swath system. We consider it likely, however, that we will require at least the same coverage with the same periodicity as described in paragraph 4.

Detailed Surveillance

7. Based on an analysis of several major weapon systems and nuclear materials installations, photography with a ground resolution of about 3 feet is adequate to determine existence and identity and to pick up changes in targets over time. In most cases, it is also adequate to provide the data for estimates of capability. However, greater resolution (on the order of one foot) would in many cases provide additional

Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

information which would make more positive the technical evaluation of an object. For example, photography of this resolution would assist us in determining important characteristics of offensive missile systems, including specific details and dimensions of missiles and sites. It would probably permit similar kinds of determinations regarding ABM systems and provide firmer knowledge on Soviet submarines. It would also contribute to our knowledge of Soviet military aircraft and certain ground force equipment. Thus, there is a requirement for resolution on the order of one foot.

8. If we were seeking only single isolated targets and the probability of acquiring such targets were high, a narrow swath (say 5 miles) with one-foot resolution would be acceptable, provided that the system described in paragraph 3 was also available. But, the targets on which we desire high resolution photography are frequently grouped at installations of fairly large size (e.g., Tyura Tam and Sary Shagan) and the locations of some are not precisely known (e.g., submarines within a naval operating base). Therefore, launch economy and requirements of intelligence analysis dictate that the swath width be as great as possible, preferably several times greater than that of the KH-7 system.

9. /Paragraph 9. deals with the number of detail surveillance missions required for minimum coverage of highest priority targets. It is still under discussion within CIA./ [redacted] 25X1

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Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

10. The frequency requirements for an advanced system with about one foot resolution cannot be specified at this time and would depend upon the swath width and other operational characteristics.

Other Capabilities

11. There are a number of additional capabilities discussed below, which we believe should also be achieved over the next five years or so. We are aware that programs are under consideration or development to meet some of them.

a. Operational Flexibility

Greater flexibility in the operation of satellite systems would increase their usefulness in many situations. For example, an on-orbit programming capability is needed in new systems to permit coverage of targets not programmed at launch. Efforts to reduce response times, both from launch decision to launch time and from launch to product delivery, should be included. Since the community interest in areas outside the Sino-Soviet land mass will continue to increase, it follows that there is a need for greater flexibility in orbit selection. Orbit and program change times should be reduced if possible to permit introduction of changes shortly prior to launch time when required. Efforts should be continued to develop the zombie mode in multi-packaged systems to conserve boosters, and to permit retargeting on the basis of the previous package results. Film capacity should not be a limiting factor in new systems as it is in KH-4 at present.

Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

b. Near-Real-Time Readout (Data Link)

There is a need to develop a near-real-time readout capability to meet requirements for indications surveillance in crisis situations. Such a capability would also be applicable to bomb damage assessment.

c. Infra-red

There is a requirement for high resolution infra-red photography to monitor the operational status of nuclear reactors, gaseous diffusion plants, and other production facilities.

d. Multi-sensor, All-Weather

A capability is required to obtain simultaneous or selective coverage by various types of sensors, on an all-weather, 24-hour basis, with near-real-time readout.

e. Geodesy and Cartography

A capability is needed to provide photogrammetric quality photography of the world's land mass to permit more accurate positioning of targets and the automatic stereocompilation of standard topographic maps.

Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5

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40	DDP TCO
41	DDS&T TCO 25X1
42	C/Action /DDS&T
43	AD/EL
44	AD/SA
45	FA/OSA
46	ID/OSA
47	SS/OSA
48	SAL/OSA
49-52	SA(COMOR)/DDS&T

Approved For Release 2007/08/07 : CIA-RDP92B01090R002500050038-5